IN THE CLAIMS:

Amendments to the Claims

Please amend claim 3 and add the new claim as shown below.

Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (original) A method intended for real-time modelling of the hydrodynamic behaviour of a multiphase fluid flow in transient phase in a pipe, considering fixed operating conditions concerning a certain number of determined structure parameters relative to the pipe and a set of determined physical quantities, with fixed variation ranges for said parameters and said physical quantities, by neural networks with inputs for structure parameters and physical quantities, and outputs where results necessary for estimation of the hydrodynamic behaviour are available, and at least one intermediate layer, the neural networks being determined iteratively so as to adjust to the values of a learning base with predetermined tables connecting different values obtained for the output data to the corresponding values of the input data, characterized in that it comprises :

- constructing several neural networks (E_{Stra}, E_{Disp}, E_{Int}) respectively dedicated to different fluid flow regimes,

- constructing a probability neural network (RN_{Proba}) suited to evaluate at all times the probabilities for the flow in the pipe to correspond respectively to the various flow regimes, and

- combining the results provided by the various neural networks weighted by said probabilities.

2. (original) A method as claimed in claim 1, characterized in that at least three neural networks respectively dedicated to the stratified flow regime, the dispersed flow regime and the intermittent flow regime are constructed, the probabilities for the fluid flow in the pipe to correspond respectively to the three flow regimes are evaluated and the results at the outputs of the three dedicated neural networks are linearly combined by weighting them by said probabilities.

3. (currently amended) A method as claimed in claim 1 ~~or 2~~, characterized in that, when the available database is sufficiently detailed to distinguish subregimes within a single flow regime, a probability neural network (RN_{Proba}) suited to evaluate at any time the probabilities for the flow in the pipe to correspond respectively to the various flow subregimes distinguished in the various flow regimes is constructed and the results provided by the various neural networks are combined by weighting them by said probabilities.

4. (new) A method as claimed in claim 2, characterized in that, when the available database is sufficiently detailed to distinguish subregimes within a single flow regime, a probability neural network (RN_{Proba}) suited to evaluate at any time the probabilities for the flow in the pipe to correspond respectively to the various flow subregimes distinguished in the various flow regimes is constructed and the results provided by the various neural networks are combined by weighting them by said probabilities.